

WHAT IS CLAIMED IS:

1. An IAD (integrated access device) system in an ADSL (Asymmetric Digital Subscriber Line) system, comprising:

5 a MACS (Multiservice Access Concentrator System) having downlink channels that include a plurality of voice channels to transmit voice signals and a plurality of data channels to transmit data, and uplink channels that include a plurality of voice channels to receive voice signals in response to the voice signals on the downlink voice channels and a plurality of data channels to receive data in response to the data on the downlink data channels, for collecting
10 voice signals and data destined for subscribers from a telephone network and the Internet; and

an IAD for receiving voice signals on the downlink voice channels and data on the downlink data channels, transmitting the voice signals and data in TDM (Time Division Multiplex) formats to corresponding telephones and computers, and transmitting voice signals and data generated from the telephones and the computers to the MACS on corresponding uplink voice channels and data channels in response to the received voice signals and data.

2. The IAD system of claim 1, wherein the IAD comprises:

a plurality of first adapters connected to the telephones and having information about TDM channels associated with the first adapters, for detecting voice signals on corresponding voice channels from the TDM format based on the channel information, transmitting the detected voice signals to the telephones, and transmitting voice signals received from the telephones on voice channels according to the channel information;

a plurality of second adapters connected to the computers and having TDM channel information associated with the second adapters, for detecting data on corresponding data
25 channels from the TDM format based on the channel information, transmitting the detected data to the computers, and transmitting data received from the computers on data channels according to the channel information; and

a home master having information about the TDM channels of the first and second adapters, for transmitting voice signals and data received on downlink voice channels and data
30 channels in the TDM format on corresponding channels according to the channel information.

3. The IAD system of claim 2, wherein the home master comprises:

a compressor/decompressor for separating the downlink voice signals from the downlink data, decompressing the separated data, compressing data destined for the MACS, combining the compressed data with transmission voice signals, and outputting the combined signals on uplink voice channels and data channels corresponding to the downlink voice channels and data channels;

a speech switch for TDM-switching the voice signals;

a MAC (Medium Access Controller) for TDM-switching the data;

a frame generator for generating a frame with the TDM-switched voice signals and data in the TDM format; and

a controller having the channel information of the adapters, for TDM-switching the speech switch and the MAC according to the channel information and controlling the frame generator to generate the frame.

4. The IAD system of claim 3, wherein the frame further includes:

a sync channel used to detect the starting point of the frame;

a telephone frequency band channel for transmitting a call process signal and a voice signal; and

a D channel for transmitting control signals of the telephone frequency band channel and a data channel.

5. The IAD system of claim 3, wherein the compressor/decompressor comprises:

a subscriber line interface for separating a telephone frequency band channel signal from the downlink voice signals and data, combining a transmission telephone frequency band signal with transmission voice signals and data, and transmitting the combined signals on uplink channels corresponding to the downlink channels;

a CODEC for converting the telephone frequency band signal to a voice signal; and

a transmission modem for decompressing the voice signals and data free of the voice signal of the telephone frequency band channel and separating the voice signals and data from

the decompressed signals.

6. The IAD system of claim 3, further comprising a master clock generator for generating a master clock signal to operate the IAD.

7. The IAD system of claim 6, further comprising a signaler for receiving the master clock signal, generating ring tones under the control of the controller upon call incoming, and generating dial tones or busy tones upon call origination.

8. The IAD system of claim 2, further comprising a power switch for bypassing a telephone frequency band channel signal received through a subscriber line to the first adapters on a power-off condition.

9. The IAD system of claim 8, wherein the power switch is a relay.

10. The IAD system of claim 3, wherein each of the first adapters comprises:
 a driver/receiver for receiving the frame;
 a clock recovery circuit for recovering a clock signal synchronized with a master clock signal from the voice signal;
 a transmission/reception controller for receiving a voice signal on a corresponding channel of the frame according to the TDM channel information, converting a signal received from a telephone connected to the first adapter to a voice signal, and transmitting the voice signal on an uplink channel corresponding to the corresponding downlink channel; and
 a signaler for generating ring tones in accordance with the clock signal under the control of the transmission/reception controller upon call termination.

11. The IAD system of claim 10, wherein the frame is transmitted via a telephone line.

12. The IAD system of claim 11, further comprising a line interface for matching impedance with respect to the length of the telephone line.

13. The IAD system of claim 12, further comprising a voltage detection and switching unit for detecting the voltage of the telephone line and bypassing a signal received via the telephone line to the telephone on a power-off condition.

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14. The IAD system of claim 3, wherein each of the second adapters comprises:
a driver/receiver for receiving the frame;
a clock recovery circuit for recovering a clock signal synchronized with the master clock signal from the data; and

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a transmission/reception controller for receiving data on a frame channel of the frame according to the TDM channel information, receiving data from a computer connected to the second adapter, and transmitting the data on an uplink channel corresponding to the downlink channel.

15. The IAD system of claim 14, wherein the frame is transmitted via a telephone line.

16. The IAD system of claim 15, further comprising a line interface for matching impedance with respect to the length of the telephone line.

17. The IAD system of claim 16, further comprising a voltage detection and switching unit for detecting the voltage of the telephone line and bypassing a signal received via the telephone line to the computer on a power-off condition.

18. The IAD system of claim 3, wherein the MACS comprises:
an interface for interfacing signals with the telephone network and the Internet;
a voice/data separation and interfacing unit for combining signals received from the telephone network under a predetermined control according to each home master;
a transmission modem for compressing the combined signals under a predetermined control and transmitting the compressed signals through a general subscriber line; and
a controller having channel information about each home master, for controlling the

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voice/data separation and interfacing unit according to the channel information and controlling the transmission modem to compress the combined signals.

19. An IAD system having at least one telephone and at least one computer in an ADSL system, comprising:

a first adapter connected to the telephone and having TDM channel information associated with the first adapter, for converting a voice signal received from the telephone to voice data and transmitting the voice data on a corresponding TDM channel via a telephone line;

a second adapter connected to the computer and having TDM channel information associated with the second adapter, for transmitting data received from the computer on a corresponding TDM channel via the telephone line;

a home master having information about the channels of the adapters, for compressing voice data and data received via the telephone line and transmitting the compressed data via a general subscriber line; and

a MACS for receiving compressed signals from each home master via the general subscriber line, decompressing the compressed signals, separating the decompressed signals according to destination networks, and transmitting the separated signals to the corresponding networks.

20. The IAD system of claim 19, wherein the home master comprises:

a frame generator/distributor for receiving channels in a predetermined TDM frame from the first and second adapters under a predetermined control and separating voice data and data from the channels;

a speech switch for receiving the voice data under the predetermined control and TDM-switching a voice signal on a telephone frequency band channel and a voice signal on a voice channel;

a MAC for receiving the data under the predetermined control and TDM-switching the received data;

a transmission modem for compressing the voice data and the data;

a CODEC for converting the voice signal of the telephone frequency band channel to

voice data;

a subscriber line interface for transmitting the voice data received from the CODEC on the telephone frequency band channel along with the compressed channel signal received from the transmission modem to the MACS through a general subscriber line; and

5 a controller having information about the channels of the adapters, for controlling the speech switch, the MAC, and the frame generator/distributor according to the channel information.

21. The IAD system of claim 20, wherein the frame further includes:

10 a sync channel used to detect a starting point of the frame;

a telephone frequency band channel for transmitting a call process signal and a voice signal;

at least one data channel for transmitting data; and

a D- channel for transmitting signaling signals of the telephone frequency band channel and the data channel.

22. The IAD system of claim 21, wherein the data channel includes at least one voice channel for transmitting voice data.

23. The IAD system of claim 21, further comprising a master clock generator for generating a master clock signal to operate the IAD.

24. The IAD system of claim 21, further comprising a signaler for receiving the master clock signal, generating ring tones under the control of the controller upon call incoming, 25 and generating dial tones or busy tones upon call origination.

25. The IAD system of claim 22, further comprising a power switch for bypassing signals from the adapters through a telephone line to a subscriber line on a power-off condition.

30 26. The IAD system of claim 25, wherein the power switch is a relay.

27. The IAD system of claim 23, wherein the first adapter comprises:

a on-hook detector for detecting the on-hook state/off-hook state of the telephone;

a clock recovery circuit for recovering a clock signal synchronized with the master clock

5 signal from the voice signal;

a signaler for generating a DTMF signal in accordance with the clock signal under the control of a transmission/reception controller upon call origination; and

a transmission/reception controller for transmitting an hook-on/hook-off signal to the home master upon detection of the on-hook state/off-hook state, transmitting a DTMF signal on
10 the D channel to the home master during dialing, converting a voice signal received from the telephone to a voice signal, and transmitting the voice signal on a corresponding TDM channel via the telephone line.

28. The IAD system of claim 23, wherein the second adapter comprises:

a buffer for buffering data received from the computer;

a clock recovery circuit for recovering a clock signal synchronized with the master clock
15 signal from the data; and

a transmission/reception controller for transmitting the buffered data on a corresponding TDM channel via the telephone line.

29. The IAD system of claim 23, wherein the MACS comprises:

a transmission modem for decompressing a signal destined for each home received via the general subscriber line under the predetermined control;

a voice/data separation/combining unit for separating signals received from the
25 transmission modem according to networks under the predetermined control;

an interface for interfacing signals with a PSTN (Public Switched Telephone Network) and the Internet; and

a controller having channel information about each home, for controlling the voice/data separation and interfacing unit according to the channel information and controlling the
30 transmission modem to decompress signals combined for the homes.